REMARKS

In the Office action, claims 11 and 12 were rejected for antecedent basis; claims 30, 31 and 36 were rejected as unpatentable over Michelson in view of Murayama and Ngarmnil; claims 32-35 were rejected as unpatentable over Michelson in view of Muller; claims 37-38 were rejected as unpatentable over Michelson in view of Murayama and Zierhofer; claim 39 was rejected as unpatentable over Michelson in view of Murayama and Shannon; claims 42-48 were rejected as unpatentable over Orban in view of Ngarmnil; claims 49 and 50 were rejected over Orban as against claim 1 in view of Shannon; and claims 40 and 41 were allowed.

As a preliminary matter, the rejections of claims 49 and 50 are traversed as being unsubstantiated. These claims stand rejected on the basis of "Orban as modified as applied in claim 1", however, claim 1 is a canceled claim. As to the rejections for antecedent basis, the claims have been amended to depend from the correct claim.

As to the rejections on the merits, with respect to claims 30, 31 and 36, (and the additional claims that depend directly or indirectly from claim 30) the Office action asserts that it is well known in the art that the subtraction of two parallel low pass filters produces a bandpass output. While there is no support in the record for this assertion, even if it is accepted for the sake of argument it does not support the three reference rejection for obviousness. Michelson plainly teaches a circuit operating in the voltage domain. One of ordinary skill in the art would simply dismiss such a modification of Michelson because implementing a voltage subtractor is relatively complex, typically requiring the use of a voltage to current converter for each voltage. Moreover, there is absolutely no suggestion in Murayama or Ngarmnil that could be used with Michelson to render obvious the claimed invention to one of ordinary skill in the art.

Murayama teaches implementing a graphic equaliser in which (see Figure 3) each band is filtered using a bi-quad filter stage (see column 3, lines 46 to 48).

Murayama does not do anything to address the prejudice which a person of mere ordinary skill would have had against implementing the bandpass filters of Michelson using a pair of low pass filters and a subtractor, because Murayama does not provide any teaching or suggestion that subtraction becomes attractive in the current domain. The obviousness rejection not only requires the ordinary artisan to leap to the concept of subtracting outputs--which would only be

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viewed as unnecessarily complex in the Michelson voltage domain (thus in itself a concept that is difficult if not highly improbable to discern from Michelson) but then to further leap by using some type of current combination. The rejection takes even a further leap stating that therefore it is obvious to produce a filter output by 'using' output currents. The Office action seems to equate 'combining' and 'using' as rending subtracting obvious. This is a rather large chasm to leap for the person of ordinary skill when faced with the voltage domain implementation of Michelson. Murayama merely shows combining currents, not subtracting them, especially not showing subtracting current outputs within a filter as presently claimed. Murayama even goes through a voltage to current conversion *after* the filter output and even then only combines those outputs (see col. 1, lines 56-62). There simply is no suggestion from the references to implement the bandpass filter with current subtraction in the current domain. As with Michelson, the filters of Murayama operate substantially in the voltage domain. Still further, Murayama does not teach implementing a bandpass filter using a pair of low pass filters.

Ngarmnil teaches a low pass, log-domain filter. Ngarmnil does not teach or suggest any modification of Michelson and/or Murayama that a bandpass filter may be implemented using a pair of such lowpass filters and a current subtractor. There is no reason why a person of ordinary skill, aware of Michelson even with Murayama as well, would have looked to Ngarmnil to improve Michelson's circuit as Michelson describes a filter arrangement which does not make use of low pass filters, and, in addition, operates only in the voltage domain.

When faced with a choice of implementing a bandpass filter with either two low pass filters or a bi-quad filter or cascaded filters, the person of mere ordinary skill will go with bi-quad or cascaded to avoid the complexity of voltage subtraction (requiring voltage to current to voltage conversion). Nothing in Murayama and/or Ngarmnil suggests the contrary.

As to claims 42-50, Orban is concerned with providing an audio peak limiter which minimizes signal distortion. Orban is wholly unrelated to the problem of providing flexible tone control.

It is respectfully submitted that to select a small portion of the highly complex circuit of Orban to support a rejection of the present invention is improper and more based on hindsight than the teachings of the references. The bandpass filter (42) of Orban does not perform any tone control function within the overall circuit of Orban. Moreover, it appears from column 6,

line 64 to column 7, line 29 of Orban that the filter (42) need only be a high-pass filter in order to eliminate low frequency intermodulation (IM) distortion introduced by the voltage controlled amplifier (30). A bandpass filter is only used because bandwidth limitation is desirable for broadcast or communication applications. To repeat, the bandpass filter of Orban is used to eliminate low frequency intermodulation distortion and does not provide for tone control of the audio signal.

Orban does not disclose adjusting the high and low-frequency cut-offs of the bandpass filter (42). This is of course not surprising as these values will be determined and fixed by the properties of the circuit itself, and in particular of the voltage controlled amplifier (30), and of the application (broadcasting), and are not determined by either the audio signal itself or the (hearing) preferences of a user. Claim 42 is plainly recites tunable filters.

It is further submitted that the skilled person, even if he had known of Orban, would have dismissed Ngarmnil as being irrelevant to the teaching of Orban. There is nothing in Orban to suggest that the circuit described therein, and in particular the bandpass filter, operates in the current mode. Given that voltage mode is the conventional operating mode for such circuits, the person of ordinary skill would have dismissed any supposed combination of Orban and Ngarmnil because Orban describes a voltage mode circuit. The circuit of Orban when viewed as a whole, or considering only the bandpass filter arrangement, is useable for small signal operation and is therefore not applicable to biomedical type applications where input and output signals are often slowly varying, large signals. In summary, Orban is concerned with voltage mode, small signal applications. The mere observation that Ngarmnil discloses a log domain filter does not render claim 42 obvious in view of the Orban reference. The claim is specific to implementing a filter by subtraction of two filter current output signals. Nothing in Ngarmnil would overcome the deficiency of Orban that the circuit is not for tone control or tunable nor to take it out of a voltage domain implementation.

Based on the foregoing, Applicants believe that all of the claims in this case are now in condition for allowance and an indication to that effect is respectfully requested.

Respectfully submitted,

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